

THE ASTROPHYSICAL JOURNAL

An International Review of Spectroscopy and
Astronomical Physics

FOUNDED IN 1895 BY GEORGE E. HALE AND JAMES E. KEELER

Published in Collaboration with the American Astronomical Society

S. CHANDRASEKHAR

Managing Editor

Yerkes Observatory of the University of Chicago

GERARD P. KUIPER

Associate Editor

EDITORIAL BOARD

HORACE W. BABCOCK (1953-57)
Mount Wilson Observatory of the
Carnegie Institution of Washington

FRED L. WHIPPLE (1952-54)
Harvard College Observatory

G. HERZBERG (1952-56)
National Research Council, Ottawa

C. D. SHANE (1952-55)
Lick Observatory, University
of California

LYMAN SPITZER, JR. (1952-53)
Princeton University Observatory

VOLUME 117

JANUARY-MAY, 1953



THE UNIVERSITY OF CHICAGO PRESS
CHICAGO, ILLINOIS

CAMBRIDGE UNIVERSITY PRESS, LONDON

PUBLISHED JANUARY, MARCH, MAY, 1953

COMPOSED AND PRINTED BY THE UNIVERSITY OF CHICAGO PRESS
CHICAGO, ILLINOIS, U.S.A.

CONTENTS

NUMBER 1

THE F-TYPE COMPONENT OF CAPELLA. Otto Struve and S. M. Kung	1
THE SPECTRUM OF 48 LIBRAE FROM 1944 TO 1952. Paul W. Merrill	7
THE MAGNETICALLY VARIABLE STAR HD 153882. Guro Gjellestad and Horace W. Babcock	12
VARIATIONS IN LIGHT OF THE SPECTRUM VARIABLES 73 DRACONIS AND IOTA CASSIOPEIAE. Sanford S. Provin	21
THE SPECTRA OF CERTAIN STARS WHOSE ATMOSPHERES MAY BE DEFICIENT IN HYDROGEN. William P. Bidelman	25
THE SOLAR SPECTRUM FROM λ 2285 TO λ 3000 A. Harold E. Clearman	29
TABLE OF INFRARED SOLAR LINES, 1.4–2.5 μ . Orren C. Mohler, A. Keith Pierce, Robert R. McMath, and Leo Goldberg	41
EJECTION OF HYDROGEN AND IONIZED CALCIUM ATOMS WITH HIGH VELOCITY AT THE TIME OF SOLAR FLARES. Helen W. Dodson, E. Ruth Hedeman, and Joseph Chamberlain	66
<i>H_a</i> EMISSION STARS AND PECULIAR OBJECTS IN THE ORION NEBULA. Guillermo Haro	73
THE TRANSFER OF THE NORTH POLAR STANDARDS TO THE SOUTHERN HEMISPHERE. Arthur N. Cox	83
ON THE SPATIAL DISTRIBUTION OF GALAXIES: A SPECIFIC MODEL. J. Neyman, E. L. Scott, and C. D. Shane	92
THE ANALYSIS OF COUNTS OF THE EXTRAGALACTIC NEBULAE IN TERMS OF A FLUCTUATING DENSITY FIELD. D. Nelson Limber	134
FLUCTUATIONS IN BRIGHTNESS OF THE MILKY WAY. D. Nelson Limber	145
THE INTERSTELLAR STRUCTURES. I. GAS CLOUDS. Eugene N. Parker	169
MAGNETO-HYDRODYNAMIC SHOCK WAVES. H. Lawrence Helfer	177
A GRAVITATIONALLY CONTRACTING STELLAR MODEL. Richard D. Levee	200
THE VARIATIONAL METHOD FOR PROBLEMS OF RADIATIVE TRANSFER. I. ISOTROPIC SCATTERING WITH A CONSTANT NET FLUX. Su-Shu Huang	211
THE VARIATIONAL METHOD FOR PROBLEMS OF RADIATIVE TRANSFER. II. THE FORMATION OF ABSORPTION LINES IN THE MILNE-EDDINGTON MODEL. Su-Shu Huang	215
THE VARIATIONAL METHOD FOR PROBLEMS OF RADIATIVE TRANSFER. III. REFLECTION EFFECT. Su-Shu Huang	221
INFLUENCE OF DOPPLER EFFECT AND DAMPING ON LINE-ABSORPTION COEFFICIENT AND ATMOSPHERIC RADIATION TRANSFER. Gilbert N. Plass and Daniel I. Fivel	225
NOTES	
RADIAL VELOCITIES OF FIVE SOUTHERN PROPER-MOTION STARS. Jorge Sahade	234
OBSERVATIONS OF HELIUM IN DIFFUSE NEBULAE. Hugh M. Johnson	235

CONTENTS

VIBRATION SPECTRUM OF $N^{14}N^{15}$. David R. Bates	236
A NEW PHOTOGRAPH OF THE $Mg\text{ II}$ DOUBLET AT 2800 Å IN THE SUN. F. S. Johnson, J. D. Purcell, R. Tousey, and N. Wilson	238
REVIEWS	240

NUMBER 2

SPECTRAL CLASSIFICATION OF THE HIGH-VELOCITY STARS. Philip C. Keenan and Geoffrey Keller	241
EXPANDING MOTIONS IN THE LACERTA AGGREGATE. A. Blaauw and W. W. Morgan	256
SOME REMARKS ON THE SPATIAL AND KINEMATIC STRUCTURE OF THE PLANETARY NEBULA IC 418. O. C. Wilson	264
A PECULIARITY OF THE SPECTRUM OF PI PEGASI. Jesse L. Greenstein	269
A NEW DETERMINATION OF THE SPECTROGRAPHIC ORBIT OF CAPELLA. Otto Struve and Ruth F. Kilby	272
THE SPECTRA OF NOVAE NEAR MINIMUM. Dean B. McLaughlin	279
ERUPTIVE PROMINENCE ASSOCIATED WITH LIMB FLARE OF MAY 8, 1951. Thomas J. Bartlett, Bruno Witte, and Walter Orr Roberts	292
COMPTON SCATTERING BY ELECTRONS WITH A MAXWELLIAN DISTRIBUTION OF THERMAL VELOCITIES. Frank N. Edmonds, Jr.	298
CONVECTIVE CORES IN STARS. Peter Naur and Donald E. Osterbrock	306
ON THE SUN'S INTERIOR. I. Epstein and L. Motz	311

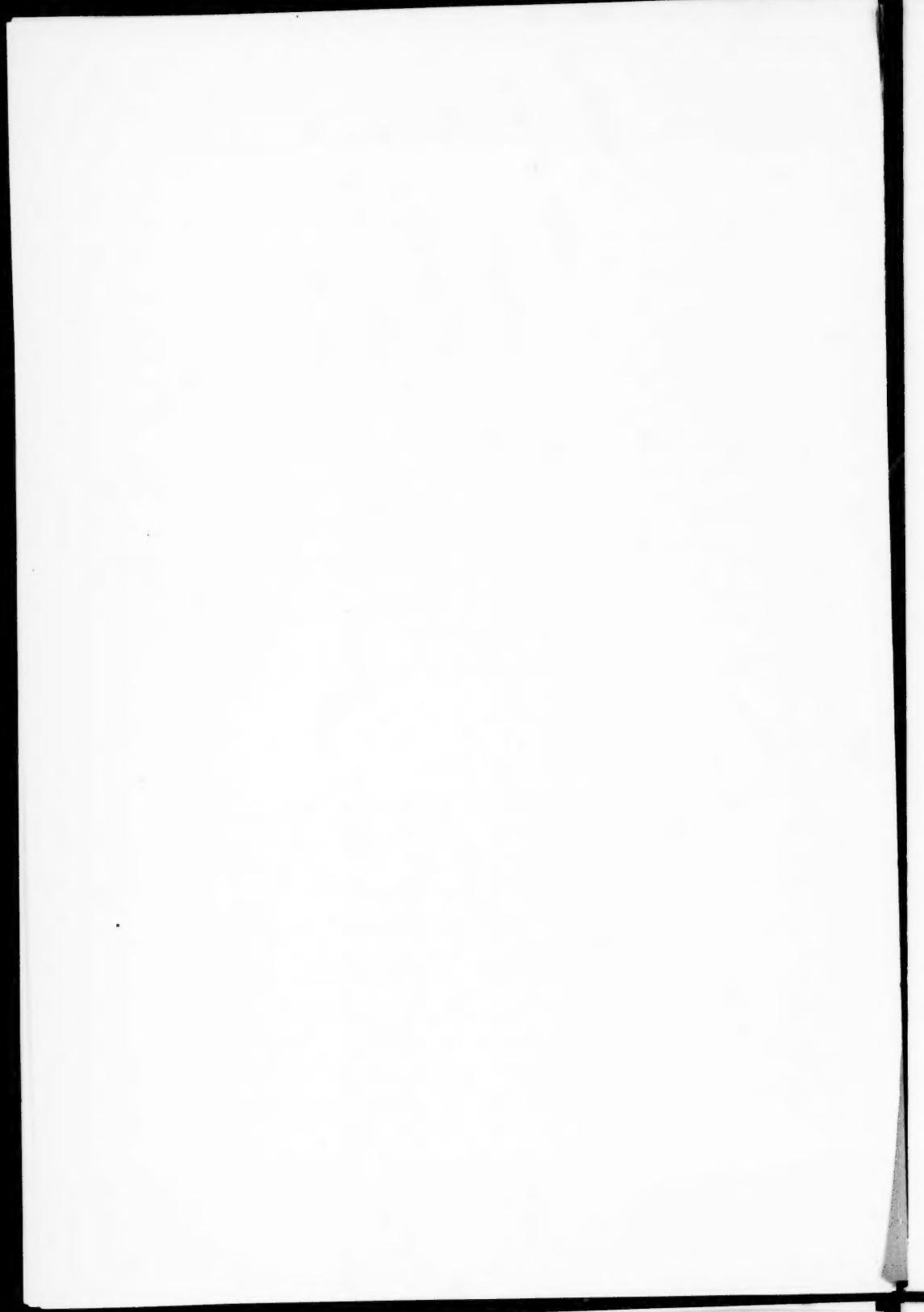
NUMBER 3

FUNDAMENTAL STELLAR PHOTOMETRY FOR STANDARDS OF SPECTRAL TYPE ON THE REVISED SYSTEM OF THE YERKES SPECTRAL <i>Atlas</i> . H. L. Johnson and W. W. Morgan	313
MAGNITUDES, COLORS, AND SPECTRAL TYPES IN M 39. Harold L. Johnson	353
MAGNITUDES AND COLORS IN NGC 752. Harold L. Johnson	356
PHOTOELECTRIC OBSERVATIONS OF VISUAL DOUBLE STARS. Harold L. Johnson	361
MAGNITUDE, COLOR, AND SPECTRAL-TYPE RELATIONS IN THE GALACTIC CLUSTER M 39. Harold F. Weaver	366
LINE OF THE RARE-EARTH ELEMENTS IN THE SPECTRUM OF R ANDROMEDAE. William P. Bidelman	377
ANALYSIS OF THE $^2\Pi - ^2\Sigma$ BANDS OF THE N_2^+ MOLECULE. A. E. Douglas	380
COLLISIONAL EXCITATION OF HYDROGEN IN A GASEOUS NEBULA. Joseph W. Chamberlain	387
THE EXCITATION OF THE NETWORK NEBULAE. Joseph W. Chamberlain	399
THE OUTER ATMOSPHERES OF SOME Be STARS. G. R. Burbidge and E. Margaret Burbidge	407
INSTABILITY OF THERMAL FIELDS. Eugene N. Parker	431

CONTENTS

v

TABULATION OF THE INCOMPLETE FERMI-DIRAC FUNCTIONS. Geoffrey Keller and Mary Fenwick	437
PHOTOELECTRIC MEASUREMENTS OF SOLAR MAGNETIC FIELDS. K. O. Kiepenheuer	447
NOTES	
A NOTE ON AURORAL MOTIONS. A. B. Meinel and D. H. Schulte	454
DIURNAL VARIATION OF [O I] 5577 IN THE NIGHTGLOW. F. E. Roach, D. R. Williams, and Helen Pettit	456
THE OZONE BAND NEAR 4.7μ IN THE SOLAR SPECTRUM. J. H. Shaw and J. N. Howard	460
ON THE SPECTRA OF THE CN^+ AND CN MOLECULES. A. E. Douglas and P. M. Routly	461
LABORATORY EXPERIMENTS ON THE DETECTABILITY OF SILANE (SiH_4) AND METHYL DEUTERIDE (CH_3D) IN THE ATMOSPHERES OF THE OUTER PLANETS. J. A. Bardwell and G. Herzberg	462
INTERSTELLAR LINES IN THE SPECTRA OF EIGHT EARLY-TYPE STARS. E. Margaret Burbidge and G. R. Burbidge	465
THE SPECTRUM OF BD+67°922. Nancy G. Roman	467
THE SPECTROSCOPIC ORBIT OF YY GEMINORUM (CASTOR C). Otto Struve and E. G. Ebbighausen	468
NOTE ON THE HR DIAGRAM OF THE PLEIADES. D. L. Harris	469
ERRATA	471
INDEX	473



INDEX TO VOLUME 117

INDEX TO SUBJECTS

Absorption Lines in the Milne-Eddington Model, The Variational Method for Problems of Radiative Transfer. II. The Formation of. <i>Su-Shu Huang</i>	215
Analysis of the $^2\Pi - ^2\Sigma$ Bands of the N_2^+ Molecule. <i>A. E. Douglas</i>	380
R Andromedae, Line of the Rare-Earth Elements in the Spectrum of. <i>William P. Bidelman</i>	377
Atmospheres of the Outer Planets, Laboratory Experiments on the Detectability of Silane (SiH_4) and Methyl Deuteride (CH_3D) in the. <i>J. A. Bardwell and G. Herzberg</i>	462
Atmospheres of Some Be Stars, The Outer. <i>G. R. Burbidge and E. Margaret Burbidge</i>	407
Atmospheric Radiation Transfer, Influence of Doppler Effect and Damping on Line-Absorption Coefficient and. <i>Gilbert N. Plass and Daniel I. Fivel</i>	225
Auroral Motions, A Note on. <i>A. B. Meinel and D. H. Schulte</i>	454
$BD+67^{\circ}922$, The Spectrum of. <i>Nancy G. Roman</i>	467
Be Stars, The Outer Atmospheres of Some. <i>G. R. Burbidge and E. Margaret Burbidge</i>	407
Brightness of the Milky Way, Fluctuations in. <i>D. Nelson Limber</i>	145
Capella, The F-Type Component of. <i>Otto Struve and S. M. Kung</i>	1
Capella, A New Determination of the Spectrographic Orbit of. <i>Otto Struve and Ruth F. Kibby</i>	272
CN Molecules, On the Spectra of the CN^+ and. <i>A. E. Douglas and P. M. Routly</i>	461
CN^+ and CN Molecules, On the Spectra of the. <i>A. E. Douglas and P. M. Routly</i>	461
Color, and Spectral-Type Relations in the Galactic Cluster M 39, Magnitude. <i>Harold F. Weaver</i>	366
Colors, and Spectral Types in M 39, Magnitudes. <i>Harold L. Johnson</i>	353
Colors in NGC 752, Magnitudes and. <i>Harold L. Johnson</i>	356
Compton Scattering by Electrons with a Maxwellian Distribution of Thermal Velocities. <i>Frank N. Edmonds, Jr.</i>	298
Convective Cores in Stars. <i>Peter Naur and Donald E. Osterbrock</i>	306
Counts of the Extragalactic Nebulae in Terms of a Fluctuating Density Field, The Analysis of. <i>D. Nelson Limber</i>	134
Deficient in Hydrogen, The Spectra of Certain Stars Whose Atmospheres May Be. <i>William P. Bidelman</i>	25
Diffuse Nebulae, Observations of Helium in. <i>Hugh M. Johnson</i>	235
Diurnal Variation of [O I] 5577 in the Nightglow. <i>F. E. Roach, D. R. Williams, and Helen Pettit</i>	456
Double Stars, Photoelectric Observations of Visual. <i>Harold L. Johnson</i>	361
73 Draconis and Iota Cassiopeiae, Variations in Light of the Spectrum Variables. <i>Sanford S. Provin</i>	21

INDEX TO SUBJECTS

Early-Type Stars, Interstellar Lines in the Spectra of Eight. <i>E. Margaret Burbidge and G. R. Burbidge</i>	465
Ejection of Hydrogen and Ionized Calcium Atoms with High Velocity at the Time of Solar Flares. <i>Helen W. Dodson, E. Ruth Hedeman, and Joseph Chamberlain</i>	66
Emission Stars and Peculiar Objects in the Region of the Orion Nebula, <i>H_a. Guillermo Haro</i>	73
Errata	471
Excitation of Hydrogen in a Gaseous Nebula, Collisional. <i>Joseph W. Chamberlain</i>	387
Excitation of the Network Nebulae, The. <i>Joseph W. Chamberlain</i>	399
Extragalactic Nebulae in Terms of a Fluctuating Density Field, The Analysis of Counts of the. <i>D. Nelson Limber</i>	134
Fermi-Dirac Functions, Tabulation of the Incomplete. <i>Geoffrey Keller and Mary Fenwick</i>	437
Fluctuations in Brightness of the Milky Way. <i>D. Nelson Limber</i>	145
Galactic Cluster M 39, Magnitude, Color, and Spectral-Type Relations in the. <i>Harold F. Weaver</i>	366
Galaxies: A Specific Model, On the Spatial Distribution of. <i>J. Neyman, E. L. Scott, and C. D. Shane</i>	92
Gas Clouds, The Interstellar Structures. I. <i>Eugene N. Parker</i>	169
Gaseous Nebula, Collisional Excitation of Hydrogen in a. <i>Joseph W. Chamberlain</i>	387
YY Geminorum (Castor C), The Spectroscopic Orbit of. <i>Otto Struve and E. G. Ebbighausen</i>	468
Gravitationally Contracting Stellar Model, A. <i>Richard D. Levee</i>	200
<i>H_a</i> Emission Stars and Peculiar Objects in the Region of the Orion Nebula. <i>Guillermo Haro</i>	73
HD 153882, The Magnetically Variable Star. <i>Guro Gjellestad and Horace W. Babcock</i>	12
Helium in Diffuse Nebulae, Observations of. <i>Hugh M. Johnson</i>	235
High-Velocity Stars, Spectral Classification of the. <i>Philip C. Keenan and Geoffrey Keller</i>	241
HR Diagram of the Pleiades, Note on the. <i>D. L. Harris</i>	469
Hydrogen in a Gaseous Nebula, Collisional Excitation of. <i>Joseph W. Chamberlain</i>	387
Hydrogen and Ionized Calcium Atoms with High Velocity at the Time of Solar Flares, Ejection of. <i>Helen W. Dodson, E. Ruth Hedeman, and Joseph Chamberlain</i>	66
Infrared Solar Lines, 1.4-2.5 μ , Table of. <i>Orren C. Mohler, A. Keith Pierce, Robert R. McMath, and Leo Goldberg</i>	41
Instability of Thermal Fields. <i>Eugene N. Parker</i>	431
Interior, On the Sun's. <i>I. Epstein and L. Motz</i>	311
Interstellar Lines in the Spectra of Eight Early-Type Stars. <i>E. Margaret Burbidge and G. R. Burbidge</i>	465
Interstellar Structures. I. Gas Clouds, The. <i>Eugene N. Parker</i>	169
Ionized Calcium Atoms with High Velocity at the Time of Solar Flares, Ejection of Hydrogen and. <i>Helen W. Dodson, E. Ruth Hedeman, and Joseph Chamberlain</i>	66
Iota Cassiopeiae, Variations in Light of the Spectrum Variables 73 Draconis and. <i>Sanford S. Provin</i>	21

INDEX TO SUBJECTS

477

Isotropic Scattering with a Constant Net Flux, The Variational Method for Problems of Radiative Transfer. I. <i>Su-Shu Huang</i>	211
Lacerta Aggregate, Expanding Motions in the. <i>A. Blaauw and W. W. Morgan</i>	256
48 Librae from 1944 to 1952, The Spectrum of. <i>Paul W. Merrill</i>	7
Limb Flare of May 8, 1951, Eruptive Prominence Associated with. <i>Thomas J. Bartlett, Bruno Witte, and Walter Orr Roberts</i>	292
Line-Absorption Coefficient and Atmospheric Radiation Transfer, Influence of Doppler Effect and Damping on. <i>Gilbert N. Plass and Daniel I. Fivel</i>	225
M 39, Magnitude, Color, and Spectral-Type Relations in the Galactic Cluster. <i>Harold F. Weaver</i>	366
M 39, Magnitudes, Colors, and Spectral Types in. <i>Harold L. Johnson</i>	353
Magnetic Fields, Photoelectric Measurements of Solar. <i>K. O. Kiepenheuer</i>	447
Magnetically Variable Star HD 153882, The. <i>Guro Gjellestad and Horace W. Babcock</i>	12
Magneto-hydrodynamic Shock Waves. <i>H. Lawrence Helfer</i>	177
Magnitude, Color, and Spectral-Type Relations in the Galactic Cluster M 39. <i>Harold F. Weaver</i>	366
Magnitudes and Colors in NGC 752. <i>Harold L. Johnson</i>	356
Magnitudes, Colors, and Spectral Types in M 39. <i>Harold L. Johnson</i>	353
Methyl Deuteride (CH_3D) in the Atmospheres of the Outer Planets, Laboratory Experiments on the Detectability of Silane (SiH_4) and. <i>J. A. Bardwell and G. Herzberg</i>	462
$Mg\text{ II}$ Doublet at 2800 Å in the Sun, A New Photograph of the. <i>F. S. Johnson, J. D. Purcell, R. Tousey, and N. Wilson</i>	238
Milky Way, Fluctuations in Brightness of the. <i>D. Nelson Limber</i>	145
Molecules, On the Spectra of the CN^+ and CN . <i>A. E. Douglas and P. M. Routly</i>	461
Motions in the Lacerta Aggregate, Expanding. <i>A. Blaauw and W. W. Morgan</i>	256
N_2^+ Molecule, Analysis of the $^2\Pi - ^2\Sigma$ Bands of the. <i>A. E. Douglas</i>	380
$N^{14}N^{15}$, Vibration Spectrum of. <i>David R. Bates</i>	236
Network Nebulae, The Excitation of the. <i>Joseph W. Chamberlain</i>	399
NGC 752, Magnitudes and Colors in. <i>Harold L. Johnson</i>	356
Nightglow, Diurnal Variation of [O I] 5577 in the. <i>F. E. Roach, D. R. Williams, and Helen Petit</i>	456
North Polar Standards to the Southern Hemisphere, The Transfer of the. <i>Arthur N. Cox</i>	83
Novae near Minimum, The Spectra of. <i>Dean B. McLaughlin</i>	279
Orbit of Capella, A New Determination of the Spectrographic. <i>Otto Struve and Ruth F. Kilby</i>	272
Orion Nebula, $H\alpha$ Emission Stars and Peculiar Objects in the Region of the. <i>Guillermo Haro</i>	73
Ozone Band near 4.7μ in the Solar Spectrum, The. <i>J. H. Shaw and J. N. Howard</i>	460
Peculiar Objects in the Region of the Orion Nebula, $H\alpha$ Emission Stars and. <i>Guillermo Haro</i>	73
Photoelectric Measurements of Solar Magnetic Fields. <i>K. O. Kiepenheuer</i>	447

INDEX TO SUBJECTS

Photoelectric Observations of Visual Double Stars. <i>Harold L. Johnson</i>	361
Pi Pegasi, A Peculiarity of the Spectrum of. <i>Jesse L. Greenstein</i>	269
Planetary Nebula IC 418, Some Remarks on the Spatial and Kinematic Structure of the. <i>O. C. Wilson</i>	264
Planets, Laboratory Experiments on the Detectability of Silane (SiH_4) and Methyl Deuteride (CH_3D) in the Atmospheres of the Outer. <i>J. A. Bardwell and G. Herzberg</i>	462
Pleiades, Note on the HR Diagram of the. <i>D. L. Harris</i>	469
Prominence Associated with Limb Flare of May 8, 1951, Eruptive. <i>Thomas J. Bartlett, Bruno Witte, and Walter Orr Roberts</i>	292
Proper-Motion Stars, Radial Velocities of Five Southern. <i>Jorge Sahade</i>	234
Radial Velocities of Five Southern Proper-Motion Stars. <i>Jorge Sahade</i>	234
Radiation Transfer, Influence of Doppler Effect and Damping on Line-Absorption Coefficient and Atmospheric. <i>Gilbert N. Plass and Daniel I. Fivel</i>	225
Radiative Transfer. I. Isotropic Scattering with a Constant Net Flux, The Variational Method for Problems of. <i>Su-Shu Huang</i>	211
Radiative Transfer. II. The Formation of Absorption Lines in the Milne-Eddington Model, The Variational Method for Problems of. <i>Su-Shu Huang</i>	215
Radiative Transfer. III. Reflection Effect, The Variational Method for Problems of. <i>Su-Shu Huang</i>	221
Rare-Earth Elements in the Spectrum of R Andromedae, Line of the. <i>William P. Bidelman</i>	377
Reflection Effect, The Variational Method for Problems of Radiative Transfer. III. <i>Su-Shu Huang</i>	221
Reviews:	
LOVELL, BERNARD, and CLEGG, J. A. <i>Radio Astronomy</i> (N. G. Roman)	240
TWYMAN, F. <i>Prism and Lens Making</i> (A. B. Meinel)	240
Silane (SiH_4) and Methyl Deuteride (CH_3D) in the Atmospheres of the Outer Planets, Laboratory Experiments on the Detectability of. <i>J. A. Bardwell and G. Herzberg</i>	462
Solar Flares, Ejection of Hydrogen and Ionized Calcium Atoms with High Velocity at the Time of. <i>Helen W. Dodson, E. Ruth Hedeman, and Joseph Chamberlain</i>	66
Solar Lines, 1.4-2.5 μ , Table of Infrared. <i>Orren C. Mohler, A. Keith Pierce, Robert R. McMath, and Leo Goldberg</i>	41
Solar Magnetic Fields, Photoelectric Measurements of. <i>K. O. Kiepenheuer</i>	447
Solar Spectrum, The Ozone Band near 4.7 μ in the. <i>J. H. Shaw and J. N. Howard</i>	460
Solar Spectrum from λ 2285 to λ 3000 Å, The. <i>Harold E. Clearman</i>	29
Southern Hemisphere, The Transfer of the North Polar Standards to the. <i>Arthur N. Cox</i>	83
Spatial Distribution of Galaxies: A Specific Model, On the. <i>J. Neyman, E. L. Scott, and C. D. Shane</i>	92
Spectra of Certain Stars Whose Atmospheres May Be Deficient in Hydrogen, The. <i>William P. Bidelman</i>	25
Spectra of the CN^+ and CN Molecules, On the. <i>A. E. Douglas and P. M. Rouly</i>	461

INDEX TO SUBJECTS

479

Spectra of Eight Early-Type Stars, Interstellar Lines in the. <i>E. Margaret Burbidge and G. R. Burbidge</i>	465
Spectra of Novae near Minimum, The. <i>Dean B. McLaughlin</i>	279
Spectral Classification of the High-Velocity Stars. <i>Philip C. Keenan and Geoffrey Keller</i>	241
Spectral Type on the Revised System of the Yerkes Spectral <i>Atlas</i> , Fundamental Stellar Photometry for Standards of. <i>H. L. Johnson and W. W. Morgan</i>	313
Spectral-Type Relations in the Galactic Cluster M 39, Magnitude, Color, and. <i>Harold F. Weaver</i>	366
Spectral Types in M 39, Magnitudes, Colors, and. <i>Harold L. Johnson</i>	353
Spectrographic Orbit of Capella, A New Determination of the. <i>Otto Struve and Ruth F. Kildy</i>	272
Spectroscopic Orbit of YY Geminorum (Castor C), The. <i>Otto Struve and E. G. Ebbighausen</i>	468
Spectrum, The Ozone Band near 4.7μ in the Solar. <i>J. H. Shaw and J. N. Howard</i>	460
Spectrum of R Andromedae, Line of the Rare-Earth Elements in the. <i>William P. Bidelman</i>	377
Spectrum of BD+67°922, The. <i>Nancy G. Roman</i>	467
Spectrum of 48 Librae from 1944 to 1952, The. <i>Paul W. Merrill</i>	7
Spectrum of $N^{14}N^{15}$, Vibration. <i>David R. Bates</i>	236
Spectrum of Pi Pegasi, A Peculiarity of the. <i>Jesse L. Greenstein</i>	269
Spectrum Variables 73 Draconis and Iota Cassiopeiae, Variations in Light of the. <i>Sanford S. Provin</i>	21
Stars, Convective Cores in. <i>Peter Naur and Donald E. Osterbrock</i>	306
Stellar Model, A Gravitationally Contracting. <i>Richard D. Levee</i>	200
Stellar Photometry for Standards of Spectral Type on the Revised System of the Yerkes <i>Atlas</i> , Fundamental. <i>H. L. Johnson and W. W. Morgan</i>	313
Sun, A New Photograph of the $Mg\text{ II}$ Doublet at 2800 Å in the. <i>F. S. Johnson, J. D. Purcell, R. Tousey, and N. Wilson</i>	238
Sun's Interior, On the. <i>I. Epstein and L. Motz</i>	311
Thermal Fields, Instability of. <i>Eugene N. Parker</i>	431
Variable Star HD 153882, The Magnetically. <i>Guro Gjellestad and Horace W. Babcock</i>	12
Variational Method for Problems of Radiative Transfer. I. Isotropic Scattering with a Constant Net Flux, The. <i>Su-Shu Huang</i>	211
Variational Method for Problems of Radiative Transfer. II. The Formation of Absorption Lines in the Milne-Eddington Model, The. <i>Su-Shu Huang</i>	215
Variational Method for Problems of Radiative Transfer. III. Reflection Effect, The. <i>Su-Shu Huang</i>	221
Variations in Light of the Spectrum Variables 73 Draconis and Iota Cassiopeiae. <i>Sanford S. Provin</i>	21
Vibration Spectrum of $N^{14}N^{15}$. <i>David R. Bates</i>	236
Yerkes Spectral <i>Atlas</i> , Fundamental Stellar Photometry for Standards of Spectral Type on the Revised System of the. <i>H. L. Johnson and W. W. Morgan</i>	313

INDEX TO AUTHORS

BABCOCK, HORACE W., and GURO GJELLESTAD. The Magnetically Variable Star HD 153882	12
BARDWELL, J. A., and G. HERZBERG. Laboratory Experiments on the Detectability of Silane (SiH_4) and Methyl Deuteride (CH_3D) in the Atmospheres of the Outer Planets	462
BARTLETT, THOMAS J., BRUNO WITTE, and WALTER ORR ROBERTS. Eruptive Prominence Associated with Limb Flare of May 8, 1951	292
BATES, DAVID R. Vibration Spectrum of $N^{14}V^{15}$	236
BIDELMAN, WILLIAM P. Line of the Rare-Earth Elements in the Spectrum of R Andromedae	377
BIDELMAN, WILLIAM P. The Spectra of Certain Stars Whose Atmospheres May Be Deficient in Hydrogen	25
BLAAUW, A., and W. W. MORGAN. Expanding Motions in the Lacerta Aggregate	256
BURBIDGE, E. MARGARET, and G. R. BURBIDGE. Interstellar Lines in the Spectra of Eight Early-Type Stars	465
BURBIDGE, E. MARGARET, and G. R. BURBIDGE. The Outer Atmospheres of Some Be Stars	407
BURBIDGE, G. R., and E. MARGARET BURBIDGE. Interstellar Lines in the Spectra of Eight Early-Type Stars	465
BURBIDGE, G. R., and E. MARGARET BURBIDGE. The Outer Atmospheres of Some Be Stars	407
CHAMBERLAIN, JOSEPH W. Collisional Excitation of Hydrogen in a Gaseous Nebula	387
CHAMBERLAIN, JOSEPH W. The Excitation of the Network Nebulae	399
CHAMBERLAIN, JOSEPH, HELEN W. DODSON, and E. RUTH HEDEMAN. Ejection of Hydrogen and Ionized Calcium Atoms with High Velocity at the Time of Solar Flares	66
CLEARMAN, HAROLD E. The Solar Spectrum from λ 2285 to λ 3000 Å	29
COX, ARTHUR N. The Transfer of the North Polar Standards to the Southern Hemisphere	83
DODSON, HELEN W., E. RUTH HEDEMAN, and JOSEPH CHAMBERLAIN. Ejection of Hydrogen and Ionized Calcium Atoms with High Velocity at the Time of Solar Flares	66
DOUGLAS, A. E. Analysis of the $^2\Pi - ^2\Sigma$ Bands of the N_2^+ Molecule	380
DOUGLAS, A. E., and P. M. ROUTLY. On the Spectra of the CN^+ and CN Molecules	461
EBBIGAUSEN, E. G., and OTTO STRUVE. The Spectroscopic Orbit of YY Geminorum (Castor C)	468
EDMONDS, FRANK N., JR. Compton Scattering by Electrons with a Maxwellian Distribution of Thermal Velocities	298
EPSTEIN, I., and L. MOTZ. On the Sun's Interior	311
FENWICK, MARY, and GEOFFREY KELLER. Tabulation of the Incomplete Fermi-Dirac Functions	437
FIVEL, DANIEL I., and GILBERT N. PLASS. Influence of Doppler Effect and Damping on Line-Absorption Coefficient and Atmospheric Radiation Transfer	225
GJELLESTAD, GURO, and HORACE W. BABCOCK. The Magnetically Variable Star HD 153882	12
GOLDBERG, LEO, ORREN C. MOHLER, A. KEITH PIERCE, and ROBERT R. McMATH. Table of Infrared Solar Lines, 1.4–2.5 μ	41
GREENSTEIN, JESSE L. A Peculiarity of the Spectrum of Pi Pegasi	269
HARO, GUILLERMO. $H\alpha$ Emission Stars and Peculiar Objects in the Region of the Orion Nebula	73

INDEX TO AUTHORS

481

HARRIS, D. L. Note on the HR Diagram of the Pleiades	469
HEDEMAN, E. RUTH, JOSEPH CHAMBERLAIN, and HELEN W. DODSON. Ejection of Hydrogen and Ionized Calcium Atoms with High Velocity at the Time of Solar Flares	66
HELPFER, H. LAWRENCE. Magneto-hydrodynamic Shock Waves	177
HERZBERG, G., and J. A. BARDWELL. Laboratory Experiments on the Detectability of Silane (SiH_4) and Methyl Deuteride (CH_3D) in the Atmospheres of the Outer Planets	462
HOWARD, J. N., and J. H. SHAW. The Ozone Band near 4.7μ in the Solar Spectrum	460
HUANG, SU-SHU. The Variational Method for Problems of Radiative Transfer. I. Isotropic Scattering with a Constant Net Flux	211
HUANG, SU-SHU. The Variational Method for Problems of Radiative Transfer. II. The Formation of Absorption Lines in the Milne-Eddington Model	215
HUANG, SU-SHU. The Variational Method for Problems of Radiative Transfer. III. Reflection Effect	221
JOHNSON, F. S., J. D. PURCELL, R. TOUSEY, and N. WILSON. A New Photograph of the $Mg\text{ II}$ Doublet at 2800 \AA in the Sun	238
JOHNSON, HAROLD L. Magnitudes and Colors in NGC 752	356
JOHNSON, HAROLD L. Magnitudes, Colors, and Spectral Types in M 39	353
JOHNSON, HAROLD L. Photoelectric Observations of Visual Double Stars	361
JOHNSON, H. L., and W. W. MORGAN. Fundamental Stellar Photometry for Standards of Spectral Type on the Revised System of the Yerkes Spectral <i>Atlas</i>	313
JOHNSON, HUGH M. Observations of Helium in Diffuse Nebulae	235
KEENAN, PHILIP C., and GEOFFREY KELLER. Spectral Classification of the High-Velocity Stars	241
KELLER, GEOFFREY, and MARY FENWICK. Tabulation of the Incomplete Fermi-Dirac Functions	437
KELLER, GEOFFREY, and PHILIP C. KEENAN. Spectral Classification of the High-Velocity Stars	241
KIEPENHEUER, K. O. Photoelectric Measurements of Solar Magnetic Fields	447
KILBY, RUTH F., and OTTO STRUVE. A New Determination of the Spectrographic Orbit of Capella	272
KUNG, S. M., and OTTO STRUVE. The F-Type Component of Capella	1
LEVEE, RICHARD D. A Gravitationally Contracting Stellar Model	200
LIMBER, D. NELSON. The Analysis of Counts of the Extragalactic Nebulae in Terms of a Fluctuating Density Field	134
LIMBER, D. NELSON. Fluctuations in Brightness of the Milky Way	145
MCLAUGHLIN, DEAN B. The Spectra of Novae near Minimum	279
MCMATH, ROBERT R., LEO GOLDBERG, ORREN C. MOHLER, and A. KEITH PIERCE. Table of Infrared Solar Lines, 1.4 - 2.5μ	41
MEINEL, A. B. Review of: <i>Prism and Lens Making</i> , by F. Twyman	240
MEINEL, A. B., and D. H. SCHULTE. A Note on Auroral Motions	454
MERRILL, PAUL W. The Spectrum of 48 Librae from 1944 to 1952	7
MOHLER, ORREN C., A. KEITH PIERCE, ROBERT R. MC MATH, and LEO GOLDBERG. Table of Infrared Solar Lines, 1.4 - 2.5μ	41
MORGAN, W. W., and A. BLAAUW. Expanding Motions in the Lacerta Aggregate	256
MORGAN, W. W., and H. L. JOHNSON. Fundamental Stellar Photometry for Standards of Spectral Type on the Revised System of the Yerkes Spectral <i>Atlas</i>	313
MOTZ, L., and I. EPSTEIN. On the Sun's Interior	311

NAUR, PETER, and DONALD E. OSTERBROCK. Convective Cores in Stars	306
NEYMAN, J., E. L. SCOTT, and C. D. SHANE. On the Spatial Distribution of Galaxies: A Specific Model	92
OSTERBROCK, DONALD E., and PETER NAUR. Convective Cores in Stars	306
PARKER, EUGENE N. Instability of Thermal Fields	431
PARKER, EUGENE N. The Interstellar Structures. I. Gas Clouds	169
PETTIT, HELEN, F. E. ROACH, and D. R. WILLIAMS. Diurnal Variation of [O I] 5577 in the Nightglow	456
PIERCE, A. KEITH, ROBERT R. McMATH, LEO GOLDBERG, and ORREN C. MOHLER. Table of Infrared Solar Lines, 1.4-2.5 μ	41
PLASS, GILBERT N., and DANIEL J. FIVEL. Influence of Doppler Effect and Damping on Line-Absorption Coefficient and Atmospheric Radiation Transfer	225
PROVIN, SANFORD S. Variations in Light of the Spectrum Variables 73 Draconis and Iota Cassiopeiae	21
PURCELL, J. D., R. TOUSEY, N. WILSON, and F. S. JOHNSON. A New Photograph of the Mg II Doublet at 2800 Å in the Sun	238
ROACH, F. E., D. R. WILLIAMS, and HELEN PETTIT. Diurnal Variation of [O I] 5577 in the Nightglow	456
ROBERTS, WALTER ORR, THOMAS J. BARTLETT, and BRUNO WITTE. Eruptive Prominence Associated with Limb Flare of May 8, 1951	292
ROMAN, N. G. Review of: <i>Radio Astronomy</i> , by Bernard Lovell and J. A. Clegg	240
ROMAN, NANCY G. The Spectrum of BD+67°922	467
ROUTLY, P. M., and A. E. DOUGLAS. On the Spectra of the CN ⁺ and CN Molecules	461
SAHADE, JORGE. Radial Velocities of Five Southern Proper-Motion Stars	234
SCHULTE, D. H., and A. B. MEINEL. A Note on Auroral Motions	454
SCOTT, E. L., C. D. SHANE, and J. NEYMAN. On the Spatial Distribution of Galaxies: A Specific Model	92
SHANE, C. D., J. NEYMAN, and E. L. SCOTT. On the Spatial Distribution of Galaxies: A Specific Model	92
SHAW, J. H., and J. N. HOWARD. The Ozone Band near 4.7 μ in the Solar Spectrum	460
STRUVE, OTTO, and E. G. EBBIGHAUSEN. The Spectroscopic Orbit of YY Geminorum (Castor C)	468
STRUVE, OTTO, and RUTH F. KILBY. A New Determination of the Spectrographic Orbit of Capella	272
STRUVE, OTTO, and S. M. KUNG. The F-Type Component of Capella	1
TOUSEY, R., N. WILSON, F. S. JOHNSON, and J. D. PURCELL. A New Photograph of the Mg II Doublet at 2800 Å in the Sun	238
WEAVER, HAROLD F. Magnitude, Color, and Spectral-Type Relations in the Galactic Cluster M 39	366
WILLIAMS, D. R., HELEN PETTIT, and F. E. ROACH. Diurnal Variation of [O I] 5577 in the Nightglow	456
WILSON, O. C. Some Remarks on the Spatial and Kinematic Structure of the Planetary Nebula IC 418	264
WILSON, N., F. S. JOHNSON, J. D. PURCELL, and R. TOUSEY. A New Photograph of the Mg II Doublet at 2800 Å in the Sun	238
WITTE, BRUNO, WALTER ORR ROBERTS, and THOMAS J. BARTLETT. Eruptive Prominence Associated with Limb Flare of May 8, 1951	292

THE ASTROPHYSICAL JOURNAL

An International Review of Spectroscopy and
Astronomical Physics

FOUNDED IN 1895 BY GEORGE E. HALE AND JAMES E. KEELER

Published in Collaboration with the American Astronomical Society

S. CHANDRASEKHAR
Managing Editor

Yerkes Observatory of the University of Chicago

GERARD P. KUIPER
Associate Editor

HORACE W. BABCOCK (1953-57)
Mount Wilson Observatory of the
Carnegie Institution of Washington

FRED L. WHIPPLE (1952-54)
Harvard College Observatory

G. HERZBERG (1952-56)
National Research Council, Ottawa

C. D. SHANE (1952-55)
Lick Observatory, University
of California

LYMAN SPITZER, JR. (1952-53)
Princeton University Observatory

VOLUME 118

JULY-NOVEMBER, 1953



THE UNIVERSITY OF CHICAGO PRESS
CHICAGO, ILLINOIS

CAMBRIDGE UNIVERSITY PRESS, LONDON

COPYRIGHT 1953 BY THE UNIVERSITY OF CHICAGO
PUBLISHED JULY, SEPTEMBER, NOVEMBER, 1953

COMPOSED AND PRINTED BY THE UNIVERSITY OF CHICAGO PRESS
CHICAGO, ILLINOIS, U.S.A.

CONTENTS

NUMBER 1

THE CRAB NEBULA AS A RADIO SOURCE. Jesse L. Greenstein and Rudolph Minkowski	1
RAPID VARIABLES IN THE ORION NEBULA. Guillermo Haro and W. W. Morgan	16
INTERCOMPARISON OF SHELL SPECTRA. Paul W. Merrill and A. Louise Lowen	18
THE RED CORONAL LINE IN THE SPECTRA OF NOVAE. Dean B. McLaughlin	27
THE ORBIT OF BOSS 1074. Roscoe F. Sanford	35
BETA CEPHEI. O. Struve, D. H. McNamara, S. M. Kung, and C. Beymer	39
THE SYSTEM OF ALPHA CORONAE BOREALIS. Gerald E. Kron and Katherine C. Gordon	55
STELLAR SPECTRA AND COLORS IN AN IRREGULAR REGION IN CYGNUS. Paul R. Annear	77
SOME CHARACTERISTICS OF COLOR SYSTEMS. W. W. Morgan, D. L. Harris, and H. L. Johnson	92
THE POSSIBLE INFLUENCE OF INTERSTELLAR CLOUDS ON STELLAR VELOCITIES. II. Lyman Spitzer, Jr., and Martin Schwarzschild	106
MAGNETIC FIELDS IN SPIRAL ARMS. S. Chandrasekhar and E. Fermi	113
PROBLEMS OF GRAVITATIONAL STABILITY IN THE PRESENCE OF A MAGNETIC FIELD. S. Chandrasekhar and E. Fermi	116
THE EFFECT OF ELECTRON SCREENING ON THERMONUCLEAR ENERGY GENERATION. Geoffrey Keller	142
THE APSIDAL MOTION AND RADIUS OF GYRATION OF THE PROTON-PROTON SOLAR MODEL. Lloyd Motz	147
VARIATIONS IN ATMOSPHERIC ABSORPTION OVER THE DISKS OF JUPITER AND SATURN. Seymour L. Hess	151
NOTES	
A PROBABLE CLUSTERING OF BLUE GIANTS IN CYGNUS. Luis Münch and W. W. Morgan	161
THE NEBULA NEAR 10 LACERTAE. Hugh M. Johnson	162
PHOTOELECTRIC MAGNITUDES AND COLORS IN NGC 6231. Robert R. Brownlee and Arthur N. Cox	165

NUMBER 2

SOLAR FLARES AND ASSOCIATED 200 MC/SEC RADIATION. Helen W. Dodson, E. Ruth Hedeman, and Leif Owren	169
STELLAR ABSORPTION LINES IN NIGHT-SKY SPECTRA. Joseph W. Chamberlain and Norman J. Oliver	197
ORIGIN OF THE CONTINUUM IN THE NIGHT-SKY SPECTRUM. A. B. Meinel	200
LABORATORY IONIC-IMPACT EMISSION SPECTRA. C. Y. Fan and A. B. Meinel	205

VIBRATION-ROTATION BANDS OF OH.	Robert C. Herman and George A. Horbeck	214
VIBRATIONAL TRANSITION PROBABILITIES OF DIATOMIC MOLECULES: COLLECTED RESULTS N_2 , N_2^+ , NO , O_2^+ .	W. R. Jarman, P. A. Fraser, and R. W. Nicholls	228
ETA CARINAE. II. THE SPECTRUM.	E. Gaviola	234
THE BALMER DECREMENT IN SOME Be STARS.	G. R. Burbidge and E. Margaret Burbidge	252
SPECTROGRAPHIC OBSERVATIONS OF SV CAMELOPARDALIS.	W. A. Hiltner	262
HD 50169, A SPECTRUM VARIABLE WITH EMISSION AT $H\alpha$.	Kenneth R. W. Brewer	265
VARIATION IN LIGHT OF THE SPECTRUM VARIABLE 56 ARIETIS.	Sanford S. Provin	281
A STATISTICAL STUDY OF THE ROTATION OF THE STARS.	Su-Shu Huang	285
A RADIO MODEL OF THE GALAXY.	Stanley P. Wyatt, Jr.	304
PHOTOELECTRIC MAGNITUDE SEQUENCES FOR THE MAGELLANIC CLOUDS.	Arthur N. Cox and Kenneth L. Hallam	314
STUDIES IN GALACTIC STRUCTURE. I. A PRELIMINARY DETERMINATION OF THE SPACE DISTRIBUTION OF THE BLUE GIANTS.	W. W. Morgan, A. E. Whitford, and A. D. Code	318
BLUE GIANTS IN THE NEIGHBORHOOD OF NGC 6231.	W. W. Morgan, Graciela González, and Guillermina González	323
INHOMOGENEOUS STELLAR MODELS. III. MODELS WITH PARTIALLY DEGENERATE ISOTHERMAL CORES.	M. Schwarzschild, I. Rabinowitz, and R. Härm	326
ASPERIC FIELD CORRECTORS FOR LARGE TELESCOPES.	A. B. Meinel	335
NOTES		
BLUE GIANTS IN THE DIRECTION OF THE GALACTIC CENTER.	W. W. Morgan, Guillermina González, and Graciela González	345
NOTE ON THE CEPHEID VARIABLE ZETA GEMINORUM.	D. L. Harris	346
EM CYG, A POSSIBLE EX-NOVA.	E. Margaret Burbidge and G. R. Burbidge	349
ROTATIONAL TEMPERATURES OF AURORAL N_2^+ BANDS.	A. Vallance Jones, D. M. Hunten, and G. G. Shephard	350
NOTE ON THE PAPER "STUDIES OF VARIABLES IN THE MAGELLANIC CLOUDS. I. TWENTY NEW FAINT VARIABLES IN A REGION IN THE SMALL CLOUD."	Martin Dartayet and Jorge Landi Dassy	351

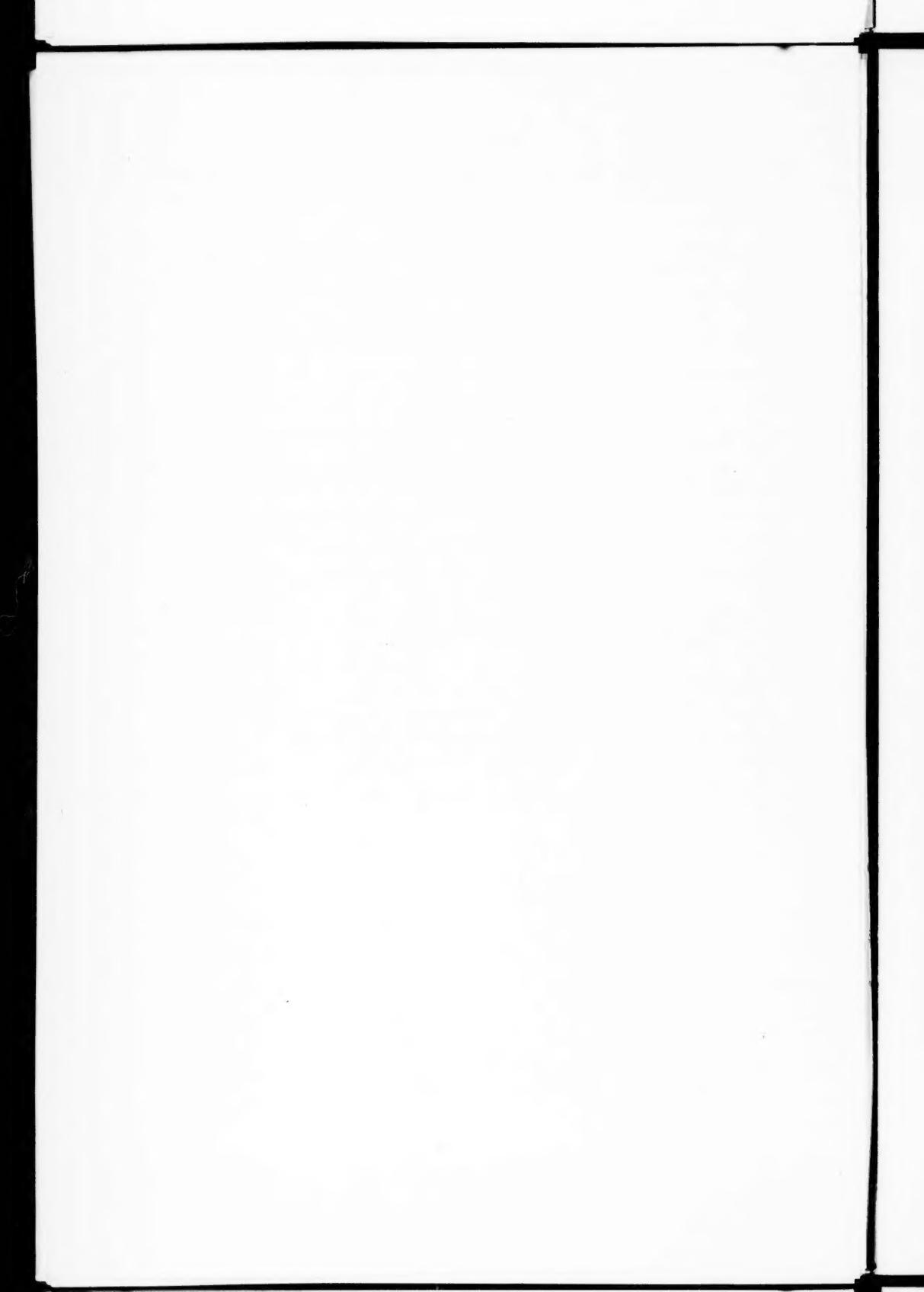
NUMBER 3

THE BRIGHTEST VARIABLE STARS IN EXTRAGALACTIC NEBULAE. I. M31 AND M33.	Edwin Hubble and Allan Sandage	353
A CATALOGUE OF EMISSION NEBULAE NEAR THE GALACTIC PLANE.	Stewart Sharpless	362
SPECTROGRAPHIC OBSERVATIONS OF GALACTIC EMISSION REGIONS AND NEBULAE.	Hugh M. Johnson	370
THE SOLAR MAGNETOGRAPH.	Horace W. Babcock	387
CARBON MONOXIDE IN THE SUN.	Leo Goldberg and Edith A. Müller	397
SPECTRA AND INTENSITY OF LIGHT FROM SOLAR CRESCENTS NEAR TOTALITY OF ECLIPSE OF FEBRUARY 25, 1952.	F. J. Heyden, S. J., C. A. Beck, D. J. Lovell, W. B. Fussell, J. H. Hancock, and E. O. Hulbert	412

CONTENTS

v

ISOPHOTAL PHOTOMETRY OF A SOLAR FLARE. Donald E. Billings and Walter Orr Roberts	429
A STUDY OF THE MOTIONS OF SOLAR PROMINENCES. Lewis Larmore	436
THE SPECTRUM OF CHI CYGNI NEAR MINIMUM LIGHT. Paul W. Merrill	453
LINE INTENSITIES IN THE SPECTRA OF COOL CARBON STARS. I. R STARS IN THE VIOLET. William Buscombe	459
A STUDY OF LINE PROFILES: THE SPECTRUM OF RHO LEONIS. Su-Shu Huang and Otto Struve	463
THE SPECTROSCOPIC BINARY 12 COMAE BERENICES. George H. Herbig and Beverly A. Turner	477
THE LIGHT-VARIATIONS OF HD 217050. Merle F. Walker	481
LIGHT-VARIATIONS OF PECULIAR A STARS. Sanford S. Provin	489
RED AND INFRARED MAGNITUDES FOR 138 STARS OBSERVED AS PHOTOMETRIC STANDARDS. Gerald E. Kron, Howard S. White, and S. C. B. Gascoigne	502
RED AND INFRARED MAGNITUDES FOR 27 SOUTHERN HEMISPHERE STARS OF EARLY SPEC- TRAL TYPE. Gerald E. Kron and S. C. B. Gascoigne	511
ON THE FRAGMENTATION OF GAS CLOUDS INTO GALAXIES AND STARS. F. Hoyle	513
THE INTERNAL STRUCTURE OF RED DWARF STARS. Donald E. Osterbrock	529
THERMAL EFFECTS OF COLLISIONAL LINE EXCITATION IN GASEOUS NEBULAE. Lawrence H. Aller	547
THE PHYSICAL THEORY OF METEORS. IV. INQUIRY INTO THE RADIATION PROBLEM—A LAB- ORATORY MODEL. Richard N. Thomas and William C. White	555
NOTES	
THE NEBULAR SPECTRUM OF NOVA PUPPIS 1942. Livio Gratto	568
NOTE ON THE SPECTRUM OF β DORADUS. Livio Gratto	570
NOTE ON SPECTRA OF COOL STARS IN THE 1μ REGION. Freeman D. Miller	572
INTERSTELLAR POLARIZATION AND MAGNETIC FIELDS. G. R. Burbidge	575
SIRIUS AND THE CARBON CYCLE. Thomas L. Swihart	577
INDEX	581



INDEX TO VOLUME 118

INDEX TO SUBJECTS

A Stars, Light-Variations of Peculiar. <i>Sanford S. Provin</i>	489
Absorption Lines in Night-Sky Spectra, Stellar. <i>Joseph W. Chamberlain and Norman J. Oliver</i>	197
Apsidal Motion and Radius of Gyration of the Proton-Proton Solar Model, The. <i>Lloyd Motz</i>	147
56 Arietis, Variation in Light of the Spectrum Variable. <i>Sanford S. Provin</i>	281
Atmospheric Absorption over the Disks of Jupiter and Saturn, Variations in. <i>Seymour L. Hess</i>	151
Auroral N_2^+ Bands, Rotational Temperatures of. <i>A. Vallance Jones, D. M. Hunten, and G. G. Shephard</i>	350
Balmer Decrement in Some Be Stars, The. <i>G. R. Burbidge and E. Margaret Burbidge</i>	252
Be Stars, The Balmer Decrement in Some. <i>G. R. Burbidge and E. Margaret Burbidge</i>	252
Blue Giants, Studies in Galactic Structure. I. A Preliminary Determination of the Space Distribution of the. <i>W. W. Morgan, A. E. Whitford, and A. D. Code</i>	318
Blue Giants in Cygnus, A Probable Clustering of. <i>Luis Münch and W. W. Morgan</i>	161
Blue Giants in the Direction of the Galactic Center. <i>W. W. Morgan, Guillermina González, and Graciela González</i>	345
Blue Giants in the Neighborhood of NGC 6231. <i>W. W. Morgan, Graciela González, and Guillermina González</i>	323
Boss 1074, The Orbit of. <i>Roscoe F. Sanford</i>	35
SV Camelopardalis, Spectrographic Observations of. <i>W. A. Hiltner</i>	262
Carbon Cycle, Sirius and the. <i>Thomas L. Swihart</i>	577
Carbon Monoxide in the Sun. <i>Leo Goldberg and Edith A. Müller</i>	397
Carbon Stars. I. R Stars in the Violet, Line Intensities in the Spectra of Cool. <i>William Buscombe</i>	459
Eta Carinae. II. The Spectrum. <i>E. Gaviola</i>	234
Beta Cephei. <i>O. Struve, D. H. McNamara, S. M. Kung, and C. Beymer</i>	39
Cepheid Variable Zeta Geminorum, Note on the. <i>D. L. Harris</i>	346
Collisional Line Excitation in Gaseous Nebulae, Thermal Effects of. <i>Lawrence H. Aller</i>	547
Color Systems, Some Characteristics of. <i>W. W. Morgan, D. L. Harris, and H. L. Johnson</i>	92
Colors in an Irregular Region in Cygnus, Stellar Spectra and. <i>Paul R. Annear</i>	77
Colors in NGC 6231, Photoelectric Magnitudes and. <i>Robert R. Brownlee and Arthur N. Cox</i>	165
12 Comae Berenices, The Spectroscopic Binary. <i>George H. Herbig and Beverly A. Turner</i>	477
Continuum in the Night-Sky Spectrum, Origin of the. <i>A. B. Meinel</i>	200

INDEX TO SUBJECTS

Cool Stars in the 1μ Region, Note on Spectra of. <i>Freeman D. Miller</i>	572
Alpha Coronae Borealis, The System of. <i>Gerald E. Kron and Katherine C. Gordon</i>	55
Coronal Line in the Spectra of Novae, The Red. <i>Dean B. McLaughlin</i>	27
Crab Nebula as a Radio Source, The. <i>Jesse L. Greenstein and Rudolph Minkowski</i>	1
EM Cyg, a Possible Ex-Nova. <i>E. Margaret Burbidge and G. R. Burbidge</i>	349
Chi Cygni near Minimum Light, The Spectrum of. <i>Paul W. Merrill</i>	453
Cygnus, A Probable Clustering of Blue Giants in. <i>Luis Münch and W. W. Morgan</i>	161
Cygnus, Stellar Spectra and Colors in an Irregular Region in. <i>Paul R. Annear</i>	77
Diatomeric Molecules: Collected Results N_2 , N_2^+ , NO , O_2^+ , Vibrational Transition Probabilities of. <i>W. R. Jarmain, P. A. Fraser, and R. W. Nicholls</i>	228
Disks of Jupiter and Saturn, Variations in Atmospheric Absorption over the. <i>Seymour L. Hess</i>	151
β Doradus, Note on the Spectrum of. <i>Livio Gratto</i>	570
Early Spectral Type, Red and Infrared Magnitudes for 27 Southern Hemisphere Stars of. <i>Gerald E. Kron and S. C. B. Gascoigne</i>	511
Eclipse of February 25, 1952, Spectra and Intensity of Light from Solar Crescents near Totality of. <i>F. J. Heyden, S. J., C. A. Beck, D. J. Lovell, W. B. Fussell, J. H. Hancock, and E. O. Hulbert</i>	412
Electron Screening on Thermonuclear Energy Generation, The Effect of. <i>Geoffrey Keller</i>	142
Emission Nebulae near the Galactic Plane, A Catalogue of. <i>Stewart Sharpless</i>	362
Emission Regions and Nebulae, Spectrographic Observations of Galactic. <i>Hugh M. Johnson</i>	370
Emission Spectra, Laboratory Ionic-Impact. <i>C. Y. Fan and A. B. Meinel</i>	205
Energy Generation, The Effect of Electron Screening on Thermonuclear. <i>Geoffrey Keller</i>	142
Ex-Nova, EM Cyg, a Possible. <i>E. Margaret Burbidge and G. R. Burbidge</i>	349
Extragalactic Nebulae. I. M31 and M33, The Brightest Variable Stars in. <i>Edwin Hubble and Allan Sandage</i>	353
Field Correctors for Large Telescopes, Aspheric. <i>A. B. Meinel</i>	335
Galactic Center, Blue Giants in the Direction of the. <i>W. W. Morgan, Guillermina González, and Graciela González</i>	345
Galactic Structure. I. A Preliminary Determination of the Space Distribution of the Blue Giants, Studies in. <i>W. W. Morgan, A. E. Whitford, and A. D. Code</i>	318
Galaxies and Stars, On the Fragmentation of Gas Clouds into. <i>F. Hoyle</i>	513
Galaxy, A Radio Model of the. <i>Stanley P. Wyatt, Jr.</i>	304
Gas Clouds into Galaxies and Stars, On the Fragmentation of. <i>F. Hoyle</i>	513
Gaseous Nebulae, Thermal Effects of Collisional Line Excitation in. <i>Lawrence H. Aller</i>	547
Zeta Geminorum, Note on the Cepheid Variable. <i>D. L. Harris</i>	346
Gravitational Stability in the Presence of a Magnetic Field, Problems of. <i>S. Chandrasekhar and E. Fermi</i>	116
HD 50169, a Spectrum Variable with Emission at Ha . <i>Kenneth R. W. Brewer</i>	265

INDEX TO SUBJECTS	583
HD 217050, The Light-Variations of. <i>Merle F. Walker</i>	481
Inhomogeneous Stellar Models. III. Models with Partially Degenerate Isothermal Cores. <i>M. Schwarzschild, I. Rabinowitz, and R. Härm</i>	326
Internal Structure of Red Dwarf Stars, The. <i>Donald E. Osterbrock</i>	529
Interstellar Clouds on Stellar Velocities. II, The Possible Influence of. <i>Lyman Spitzer, Jr., and Martin Schwarzschild</i>	106
Interstellar Polarization and Magnetic Fields. <i>G. R. Burbidge</i>	575
Ionic-Impact Emission Spectra, Laboratory. <i>C. Y. Fan and A. B. Meinel</i>	205
Jupiter and Saturn, Variations in Atmospheric Absorption over the Disks of. <i>Seymour L. Hess</i>	151
10 Lacertae, The Nebula near. <i>Hugh M. Johnson</i>	162
Large Telescopes, Aspheric Field Correctors for. <i>A. B. Meinel</i>	335
Rho Leonis, A Study of Line Profiles: The Spectrum of. <i>Su-Shu Huang and Otto Struve</i>	463
Light-Variations of HD 217050, The. <i>Merle F. Walker</i>	481
Light-Variations of Peculiar A Stars. <i>Sanford S. Provin</i>	489
Line Excitation in Gaseous Nebulae, Thermal Effects of Collisional. <i>Lawrence H. Aller</i>	547
Line Intensities in the Spectra of Cool Carbon Stars. I. R Stars in the Violet. <i>William Buscombe</i>	459
Line Profiles: The Spectrum of Rho Leonis, A Study of. <i>Su-Shu Huang and Otto Struve</i>	463
M31 and M33, The Brightest Variable Stars in Extragalactic Nebulae. I. <i>Edwin Hubble and Allan Sandage</i>	353
M33, The Brightest Variable Stars in Extragalactic Nebulae. I. M31 and. <i>Edwin Hubble and Allan Sandage</i>	353
Magellanic Clouds, Photoelectric Magnitude Sequences for the. <i>Arthur N. Cox and Kenneth L. Hallam</i>	314
Magellanic Clouds. I. Twenty New Faint Variables in a Region in the Small Cloud," Note on the Paper "Studies of Variables in the. <i>Martin Dartayet and Jorge Landi Dassy</i>	351
Magnetic Field, Problems of Gravitational Stability in the Presence of a. <i>S. Chandrasekhar and E. Fermi</i>	116
Magnetic Fields, Interstellar Polarization and. <i>G. R. Burbidge</i>	575
Magnetic Fields in Spiral Arms. <i>S. Chandrasekhar and E. Fermi</i>	113
Magnetograph, The Solar. <i>Horace W. Babcock</i>	387
Magnitude Sequences for the Magellanic Clouds, Photoelectric. <i>Arthur N. Cox and Kenneth L. Hallam</i>	314
Magnitudes and Colors in NGC 6231, Photoelectric. <i>Robert R. Brownlee and Arthur N. Cox</i>	165
Meteors. IV. Inquiry into the Radiation Problem—a Laboratory Model, The Physical Theory of. <i>Richard N. Thomas and William C. White</i>	555
Motions of Solar Prominences, A Study of the. <i>Lewis Larmore</i>	436
N_2^+ Bands, Rotational Temperatures of Auroral. <i>A. Vallance Jones, D. M. Hunten, and G. G. Shephard</i>	350
Nebula, Rapid Variables in the Orion. <i>Guillermo Haro and W. W. Morgan</i>	16

Nebula as a Radio Source, The Crab. <i>Jesse L. Greenstein and Rudolph Minkowski</i>	1
Nebula near 10 Lacertae, The. <i>Hugh M. Johnson</i>	162
Nebulae, Spectrographic Observations of Galactic Emission Regions and. <i>Hugh M. Johnson</i>	370
Nebulae near the Galactic Plane, A Catalogue of Emission. <i>Stewart Sharpless</i>	362
Nebulae. I. M31 and M33, The Brightest Variable Stars in Extragalactic. <i>Edwin Hubble and Allan Sandage</i>	353
Nebular Spectrum of Nova Puppis 1942, The. <i>Livio Gratto</i>	568
NGC 6231, Blue Giants in the Neighborhood of. <i>W. W. Morgan, Graciela González, and Guillermín González</i>	323
NGC 6231, Photoelectric Magnitudes and Colors in. <i>Robert R. Brownlee and Arthur N. Cox</i>	165
Night-Sky Spectra, Stellar Absorption Lines in. <i>Joseph W. Chamberlain and Norman J. Oliver</i>	197
Night-Sky Spectrum, Origin of the Continuum in the. <i>A. B. Meinel</i>	200
Nova Puppis 1942, The Nebular Spectrum of. <i>Livio Gratto</i>	568
Novae, The Red Coronal Line in the Spectra of. <i>Dean B. McLaughlin</i>	27
<i>OH</i> , Vibration-Rotation Bands of. <i>Robert C. Herman and George A. Horbeck</i>	214
Orbit of Boss 1074, The. <i>Roscoe F. Sanford</i>	35
Orion Nebula, Rapid Variables in the. <i>Guillermo Haro and W. W. Morgan</i>	16
Peculiar A Stars, Light-Variations of. <i>Sanford S. Provin</i>	489
Photometric Standards, Red and Infrared Magnitudes for 138 Stars Observed as. <i>Gerald E. Kron, Howard S. White, and S. C. B. Gascoigne</i>	502
Photometry of a Solar Flare, Isophotal. <i>Donald E. Billings and Walter Orr Roberts</i>	429
Physical Theory of Meteors. IV. Inquiry into the Radiation Problem—a Laboratory Model, The. <i>Richard N. Thomas and William C. White</i>	555
Polarization and Magnetic Fields, Interstellar. <i>G. R. Burbidge</i>	575
Proton-Proton Solar Model, The Apsidal Motion and Radius of Gyration of the. <i>Lloyd Motz</i>	147
R Stars in the Violet, Line Intensities in the Spectra of Cool Carbon Stars. I. <i>William Buscombe</i>	459
Radio Frequency Radiation, Solar Flares and Associated. <i>Helen W. Dodson, E. Ruth Hedeman, and Leif Owren</i>	169
Radio Model of the Galaxy, A. <i>Stanley P. Wyatt, Jr.</i>	304
Radio Source, The Crab Nebula as a. <i>Jesse L. Greenstein and Rudolph Minkowski</i>	1
Red Dwarf Stars, The Internal Structure of. <i>Donald E. Osterbrock</i>	529
Red and Infrared Magnitudes for 27 Southern Hemisphere Stars of Early Spectral Type. <i>Gerald E. Kron and S. C. B. Gascoigne</i>	511
Red and Infrared Magnitudes for 138 Stars Observed as Photometric Standards. <i>Gerald E. Kron, Howard S. White, and S. C. B. Gascoigne</i>	502
Rotation of the Stars, A Statistical Study of the. <i>Su-Shu Huang</i>	285

INDEX TO SUBJECTS

585

Rotational Temperatures of Auroral N_2^+ Bands. <i>A. Vallance Jones, D. M. Hunten, and G. G. Shephard</i>	350
Saturn, Variations in Atmospheric Absorption over the Disks of Jupiter and. <i>Seymour L. Hess</i>	151
Shell Spectra, Intercomparison of. <i>Paul W. Merrill and A. Louise Lowen</i>	18
Sirius and the Carbon Cycle. <i>Thomas L. Swihart</i>	577
Solar Crescents near Totality of Eclipse of February 25, 1952, Spectra and Intensity of Light from. <i>F. J. Heyden, S.J., C. A. Beck, D. J. Lovell, W. B. Fussell, J. H. Hancock, and E. O. Hulbert</i>	412
Solar Flare, Isophotal Photometry of a. <i>Donald E. Billings and Walter Orr Roberts</i>	429
Solar Flares and Associated 200 Mc/Sec Radiation. <i>Helen W. Dodson, E. Ruth Hedeman, and Leif Owren</i>	169
Solar Magnetograph, The. <i>Horace W. Babcock</i>	387
Solar Model, The Apsidal Motion and Radius of Gyration of the Proton-Proton. <i>Lloyd Motz</i>	147
Solar Prominences, A Study of the Motions of. <i>Lewis Larmore</i>	436
Southern Hemisphere Stars of Early Spectral Type, Red and Infrared Magnitudes for 27. <i>Gerald E. Kron and S. C. B. Gascoigne</i>	511
Space Distribution of the Blue Giants, Studies in Galactic Structure. I. A Preliminary Determination of the. <i>W. W. Morgan, A. E. Whitford, and A. D. Code</i>	318
Spectra, Intercomparison of Shell. <i>Paul W. Merrill and A. Louise Lowen</i>	18
Spectra, Laboratory Ionic-Impact Emission. <i>C. Y. Fan and A. B. Meinel</i>	205
Spectra, Stellar Absorption Lines in Night-Sky. <i>Joseph W. Chamberlain and Norman J. Oliver</i>	197
Spectra and Colors in an Irregular Region in Cygnus, Stellar. <i>Paul R. Annear</i>	77
Spectra of Cool Carbon Stars. I. R Stars in the Violet, Line Intensities in the. <i>William Buscombe</i>	459
Spectra of Cool Stars in the 1μ Region, Note on. <i>Freeman D. Miller</i>	572
Spectra and Intensity of Light from Solar Crescents near Totality of Eclipse of February 25, 1952. <i>F. J. Heyden, S.J., C. A. Beck, D. J. Lovell, W. B. Fussell, J. H. Hancock, and E. O. Hulbert</i>	412
Spectra of Novae, The Red Coronal Line in the. <i>Dean B. McLaughlin</i>	27
Spectrographic Observations of SV Camelopardalis. <i>W. A. Hiltner</i>	262
Spectrographic Observations of Galactic Emission Regions and Nebulae. <i>Hugh M. Johnson</i>	370
Spectroscopic Binary 12 Comae Berenices, The. <i>George H. Herbig and Beverly A. Turner</i>	477
Spectrum, Eta Carinae. II. The. <i>E. Gaviola</i>	234
Spectrum, Origin of the Continuum in the Night-Sky. <i>A. B. Meinel</i>	200
Spectrum of Chi Cygni near Minimum Light, The. <i>Paul W. Merrill</i>	453
Spectrum of β Doradus, Note on the. <i>Livio Gratto</i>	570
Spectrum of Nova Puppis 1942, The Nebular. <i>Livio Gratto</i>	568
Spectrum Variable 56 Arietis, Variation in Light of the. <i>Sanford S. Provin</i>	281

INDEX TO SUBJECTS

Spectrum Variable with Emission at $H\alpha$, HD 50169, a. <i>Kenneth R. W. Brewer</i>	265
Spiral Arms, Magnetic Fields in. <i>S. Chandrasekhar and E. Fermi</i>	113
Stars, On the Fragmentation of Gas Clouds into Galaxies and. <i>F. Hoyle</i>	513
Stellar Models. III. Models with Partially Degenerate Isothermal Cores, Inhomogeneous. <i>M. Schwarzschild, I. Rabinowitz, and R. Härn</i>	326
Stellar Velocities. II, The Possible Influence of Interstellar Clouds on. <i>Lyman Spitzer, Jr., and Martin Schwarzschild</i>	106
Sun, Carbon Monoxide in the. <i>Leo Goldberg and Edith A. Müller</i>	397
Transition Probabilities of Diatomic Molecules: Collected Results N_2 , N_2^+ , NO , O_2^+ , Vibrational. <i>W. R. Jarman, P. A. Fraser, and R. W. Nicholls</i>	228
Variable 56 Arietis, Variation in Light of the Spectrum. <i>Sanford S. Provin</i>	281
Variable with Emission at $H\alpha$, HD 50169, a Spectrum. <i>Kenneth R. W. Brewer</i>	265
Variable Zeta Geminorum, Note on the Cepheid. <i>D. L. Harris</i>	346
Variable Stars in Extragalactic Nebulae. I. M31 and M33, The Brightest. <i>Edwin Hubble and Allan Sandage</i>	353
Variables in the "agellanic Clouds. I. Twenty New Faint Variables in a Region in the Small Cloud," Note on the Paper "Studies of. <i>Martin Dartayet and Jorge Landi Dassy</i>	351
Variables in the Orion Nebula, Rapid. <i>Guillermo Haro and W. W. Morgan</i>	16
Vibration-Rotation Bands of OH. <i>Robert C. Herman and George A. Horbeck</i>	214
Vibrational Transition Probabilities of Diatomic Molecules: Collected Results N_2 , N_2^+ , NO , O_2^+ . <i>W. R. Jarman, P. A. Fraser, and R. W. Nicholls</i>	228

INDEX TO AUTHORS

ALLER, LAWRENCE H. Thermal Effects of Collisional Line Excitation in Gaseous Nebulae	547
ANNEAR, PAUL R. Stellar Spectra and Colors in an Irregular Region in Cygnus	77
BABCOCK, HORACE W. The Solar Magnetograph	387
BECK, C. A., D. J. LOVELL, W. B. FUSSELL, J. H. HANCOCK, E. O. HULBURT, and F. J. HEYDEN, S.J. Spectra and Intensity of Light from Solar Crescents near Totality of Eclipse of February 25, 1952	412
BEYMER, C., O. STRUVE, D. H. McNAMARA, and S. M. KUNG. Beta Cephei	39
BILLINGS, DONALD E., and WALTER ORR ROBERTS. Isophotal Photometry of a Solar Flare	429
BREWER, KENNETH R. W. HD 50169, a Spectrum Variable with Emission at $H\alpha$	265
BROWNLEE, ROBERT R., and ARTHUR N. COX. Photoelectric Magnitudes and Colors in NGC 6231	165
BURBIDGE, E. MARGARET, and G. R. BURBIDGE. The Balmer Decrement in Some Be Stars	252
BURBIDGE, E. MARGARET, and G. R. BURBIDGE. EM Cyg, a Possible Ex-Nova	349
BURBIDGE, G. R. Interstellar Polarization and Magnetic Fields	575
BURBIDGE, G. R., and E. MARGARET BURBIDGE. The Balmer Decrement in Some Be Stars	252
BURBIDGE, G. R., and E. MARGARET BURBIDGE. EM Cyg, a Possible Ex-Nova	349

INDEX TO AUTHORS

587

BUSCOMBE, WILLIAM. Line Intensities in the Spectra of Cool Carbon Stars. I. R Stars in the Violet	459
CHAMBERLAIN, JOSEPH W., and NORMAN J. OLIVER. Stellar Absorption Lines in Night-Sky Spectra	197
CHANDRASEKHAR, S., and E. FERMI. Magnetic Fields in Spiral Arms	113
CHANDRASEKHAR, S., and E. FERMI. Problems of Gravitational Stability in the Presence of a Magnetic Field	116
CODE, A. D., W. W. MORGAN, and A. E. WHITFORD. Studies in Galactic Structure. I. A Preliminary Determination of the Space Distribution of the Blue Giants	318
COX, ARTHUR N., and ROBERT R. BROWNLEE. Photoelectric Magnitudes and Colors in NGC 6231	165
COX, ARTHUR N., and KENNETH L. HALLAM. Photoelectric Magnitude Sequences for the Magellanic Clouds	314
DARTAYET, MARTIN, and JORGE LANDI DESSY. Note on the Paper "Studies of Variables in the Magellanic Clouds. I. Twenty New Faint Variables in a Region in the Small Cloud"	351
DESSY, JORGE LANDI, and MARTIN DARTAYET. Note on the Paper "Studies of Variables in the Magellanic Clouds. I. Twenty New Faint Variables in a Region in the Small Cloud"	351
DODSON, HELEN W., E. RUTH HEDEMAN, and LEIF OWREN. Solar Flares and Associated 200 Mc/Sec Radiation	169
FAN, C. Y., and A. B. MEINEL. Laboratory Ionic-Impact Emission Spectra	205
FERMI, E., and S. CHANDRASEKHAR. Magnetic Fields in Spiral Arms	113
FERMI, E., and S. CHANDRASEKHAR. Problems of Gravitational Stability in the Presence of a Magnetic Field	116
FRASER, P. A., R. W. NICHOLLS, and W. R. JARMAIN. Vibrational Transition Probabilities of Diatomic Molecules: Collected Results N_2 , N_2^+ , NO , O_2^+	228
FUSSELL, W. B., J. H. HANCOCK, E. O. HULBURT, F. J. HEYDEN, S.J., C. A. BECK, and D. J. LOVELL. Spectra and Intensity of Light from Solar Crescents near Totality of Eclipse of February 25, 1952	412
GASCOIGNE, S. C. B., and GERALD E. KRON. Red and Infrared Magnitudes for 27 Southern Hemisphere Stars of Early Spectral Type	511
GASCOIGNE, S. C. B., GERALD E. KRON, and HOWARD S. WHITE. Red and Infrared Magnitudes for 138 Stars Observed as Photometric Standards	502
GAVIOLA, E. Eta Carinae. II. The Spectrum	234
GOLDBERG, LEO, and EDITH A. MÜLLER. Carbon Monoxide in the Sun	397
GONZÁLEZ, GRACIELA, GUILLERMINA GONZÁLEZ, and W. W. MORGAN. Blue Giants in the Neighborhood of NGC 6231	323
GONZÁLEZ, GRACIELA, W. W. MORGAN, and GUILLERMINA GONZÁLEZ. Blue Giants in the Direction of the Galactic Center	345
GONZÁLEZ, GUILLERMINA, GRACIELA GONZÁLEZ, and W. W. MORGAN. Blue Giants in the Direction of the Galactic Center	345
GONZÁLEZ, GUILLERMINA, W. W. MORGAN, and GRACIELA GONZÁLEZ. Blue Giants in the Neighborhood of NGC 6231	323
GORDON, KATHERINE C., and GERALD E. KRON. The System of Alpha Coronae Borealis	55

GRATTON, LIVIO. The Nebular Spectrum of Nova Puppis 1942	568
GRATTON, LIVIO. Note on the Spectrum of β Doradus	570
GREENSTEIN, JESSE L., and RUDOLPH MINKOWSKI. The Crab Nebula as a Radio Source	1
HÄRM, R., M. SCHWARZSCHILD, and I. RABINOWITZ. Inhomogeneous Stellar Models. III. Models with Partially Degenerate Isothermal Cores	326
HALLAM, KENNETH L., and ARTHUR N. COX. Photoelectric Magnitude Sequences for the Magellanic Clouds	314
HANCOCK, J. H., E. O. HULBURT, F. J. HEYDEN, S.J., C. A. BECK, D. J. LOVELL, and W. B. FUSSELL. Spectra and Intensity of Light from Solar Crescents near Totality of Eclipse of February 25, 1952	412
HARO, GUILLERMO, and W. W. MORGAN. Rapid Variables in the Orion Nebula	16
HARRIS, D. L. Note on the Cepheid Variable Zeta Geminorum	346
HARRIS, D. L., H. L. JOHNSON, and W. W. MORGAN. Some Characteristics of Color Systems	92
HEDEMAN, E. RUTH, LEIF OWREN, and HELEN W. DODSON. Solar Flares and Associated 200 Mc/Sec Radiation	169
HERBIG, GEORGE H., and BEVERLY A. TURNER. The Spectroscopic Binary 12 Comae Berenices	477
HERMAN, ROBERT C., and GEORGE A. HORBECK. Vibration-Rotation Bands of OH	214
HESS, SEYMOUR L. Variations in Atmospheric Absorption over the Disks of Jupiter and Saturn	151
HEYDEN, F. J., S.J., C. A. BECK, D. J. LOVELL, W. B. FUSSELL, J. H. HANCOCK, and E. O. HULBURT. Spectra and Intensity of Light from Solar Crescents near Totality of Eclipse of February 25, 1952	412
HILTNER, W. A. Spectrographic Observations of SV Camelopardalis	262
HORBECK, GEORGE A., and ROBERT C. HERMAN. Vibration-Rotation Bands of OH	214
HOYLE, F. On the Fragmentation of Gas Clouds into Galaxies and Stars	513
HUANG, SU-SHU. A Statistical Study of the Rotation of the Stars	285
HUANG, SU-SHU, and OTTO STRUVE. A Study of Line Profiles: The Spectrum of Rho Leonis	463
HUBBLE, EDWIN, and ALLAN SANDAGE. The Brightest Variable Stars in Extragalactic Nebulae. I. M31 and M33	353
HULBURT, E. O., F. J. HEYDEN, S.J., C. A. BECK, D. J. LOVELL, W. B. FUSSELL, and J. H. HANCOCK. Spectra and Intensity of Light from Solar Crescents near Totality of Eclipse of February 25, 1952	412
HUNTEM, D. M., G. G. SHEPHERD, and A. VALLANCE JONES. Rotational Temperatures of Auroral N_2^+ Bands	350
JARMAIN, W. R., P. A. FRASER, and R. W. NICHOLLS. Vibrational Transition Probabilities of Diatomic Molecules: Collected Results N_2 , N_2^+ , NO , O_2^+	228
JOHNSON, H. L., W. W. MORGAN, and D. L. HARRIS. Some Characteristics of Color Systems	92
JOHNSON, HUGH M. The Nebula near 10 Lacertae	162
JOHNSON, HUGH M. Spectrographic Observations of Galactic Emission Regions and Nebulae	370

INDEX TO AUTHORS

589

JONES, A. VALLANCE, D. M. HUNTER, and G. G. SHEPARD. Rotational Temperatures of Auroraal N_2^+ Bands	350
KELLER, GEOFFREY. The Effect of Electron Screening on Thermonuclear Energy Generation	142
KRON, GERALD E., and S. C. B. GASCOIGNE. Red and Infrared Magnitudes for 27 Southern Hemisphere Stars of Early Spectral Type	511
KRON, GERALD E., and KATHERINE C. GORDON. The System of Alpha Coronae Borealis	55
KRON, GERALD E., HOWARD S. WHITE, and S. C. B. GASCOIGNE. Red and Infrared Magnitudes for 138 Stars Observed as Photometric Standards	502
KUNG, S. M., C. BEYMER, O. STRUVE, and D. H. McNAMARA. Beta Cephei	39
LARMORE, LEWIS. A Study of the Motions of Solar Prominences	436
LOVELL, D. J., W. B. FUSSELL, J. H. HANCOCK, E. O. HULBURT, F. J. HEYDEN, S. J., and C. A. BECK. Spectra and Intensity of Light from Solar Crescents near Totality of Eclipse of February 25, 1952	412
LOWEN, A. LOUISE, and PAUL W. MERRILL. Intercomparison of Shell Spectra	18
MCLAUGHLIN, DEAN B. The Red Coronal Line in the Spectra of Novae	27
McNAMARA, D. H., S. M. KUNG, C. BEYMER, and O. STRUVE. Beta Cephei	39
MEINEL, A. B. Aspheric Field Correctors for Large Telescopes	335
MEINEL, A. B. Origin of the Continuum in the Night-Sky Spectrum	200
MEINEL, A. B., and C. Y. FAN. Laboratory Ionic-Impact Emission Spectra	205
MERRILL, PAUL W. The Spectrum of Chi Cygni near Minimum Light	453
MERRILL, PAUL W., and A. LOUISE LOWEN. Intercomparison of Shell Spectra	18
MILLER, FREEMAN D. Note on Spectra of Cool Stars in the 1μ Region	572
MINKOWSKI, RUDOLPH, and JESSE L. GREENSTEIN. The Crab Nebula as a Radio Source	1
MORGAN, W. W., GRACIELA GONZÁLEZ, and GUILLERMINA GONZÁLEZ. Blue Giants in the Neighborhood of NGC 6231	323
MORGAN, W. W., GUILLERMINA GONZÁLEZ, and GRACIELA GONZÁLEZ. Blue Giants in the Direction of the Galactic Center	345
MORGAN, W. W., and GUILLERMO HARO. Rapid Variables in the Orion Nebula	16
MORGAN, W. W., D. L. HARRIS, and H. L. JOHNSON. Some Characteristics of Color Systems	92
MORGAN, W. W., and LUIS MÜNCH. A Probable Clustering of Blue Giants in Cygnus	161
MORGAN, W. W., A. E. WHITFORD, and A. D. CODE. Studies in Galactic Structure. I. A Preliminary Determination of the Space Distribution of the Blue Giants	318
MOTZ, LLOYD. The Apsidal Motion and Radius of Gyration of the Proton-Proton Solar Model	147
MÜLLER, EDITH A., and LEO GOLDBERG. Carbon Monoxide in the Sun	397
MÜNCH, LUIS, and W. W. MORGAN. A Probable Clustering of Blue Giants in Cygnus	161
NICHOLLS, R. W., W. R. JARMAIN, and P. A. FRASER. Vibrational Transition Probabilities of Diatomic Molecules: Collected Results N_2 , N_2^+ , NO , O_2^+	228

INDEX TO AUTHORS

OLIVER, NORMAN J., and JOSEPH W. CHAMBERLAIN. Stellar Absorption Lines in Night-Sky Spectra	197
OSTERBROCK, DONALD E. The Internal Structure of Red Dwarf Stars	529
OWREN, LEIF, HELEN W. DODSON, and E. RUTH HEDEMAN. Solar Flares and Associated 200 Mc/Sec Radiation	169
PROVIN, SANFORD S. Light-Variations of Peculiar A Stars	489
PROVIN, SANFORD S. Variation in Light of the Spectrum Variable 56 Arietis	281
RABINOWITZ, I., R. HÄRM, and M. SCHWARZSCHILD. Inhomogeneous Stellar Models. III. Models with Partially Degenerate Isothermal Cores	326
ROBERTS, WALTER ORR, and DONALD E. BILLINGS. Isophotal Photometry of a Solar Flare	429
SANDAGE, ALLAN, and EDWIN HUBBLE. The Brightest Variable Stars in Extragalactic Nebulae. I. M31 and M33	353
SANFORD, ROSCOE F. The Orbit of Boss 1074	35
SCHWARZSCHILD, M., I. RABINOWITZ, and R. HÄRM. Inhomogenous Stellar Models. III. Models with Partially Degenerate Isothermal Cores	326
SCHWARZSCHILD, MARTIN, and LYMAN SPITZER, JR. The Possible Influence of Interstellar Clouds on Stellar Velocities. II	106
SHARPLESS, STEWART. A Catalogue of Emission Nebulae near the Galactic Plane	362
SHEPARD, G. G., A. VALLANCE JONES, and D. M. HUNTER. Rotational Temperatures of Auroral N_2^+ Bands	350
SPITZER, LYMAN, JR., and MARTIN SCHWARZSCHILD. The Possible Influence of Interstellar Clouds on Stellar Velocities. II	106
STRUVE, OTTO, and SU-SHU HUANG. A Study of Line Profiles: The Spectrum of Rho Leonis	463
STRUVE, O., D. H. McNAMARA, S. M. KUNG, and C. BEYMER. Beta Cephei	39
SWIHART, THOMAS L. Sirius and the Carbon Cycle	577
THOMAS, RICHARD N., and WILLIAM C. WHITE. The Physical Theory of Meteors. IV. Inquiry into the Radiation Problem—a Laboratory Model	555
TURNER, BEVERLY A., and GEORGE H. HERBIG. The Spectroscopic Binary 12 Comae Berenices	477
WALKER, MERLE F. The Light-Variations of HD 217050	481
WHITE, HOWARD S., S. C. B. GASCOIGNE, and GERALD E. KRON. Red and Infrared Magnitudes for 138 Stars Observed as Photometric Standards	502
WHITE, WILLIAM C., and RICHARD N. THOMAS. The Physical Theory of Meteors. IV. Inquiry into the Radiation Problem—a Laboratory Model	555
WHITFORD, A. E., A. D. CODE, and W. W. MORGAN. Studies in Galactic Structure. I. A Preliminary Determination of the Space Distribution of the Blue Giants	318
WYATT, STANLEY P., JR. A Radio Model of the Galaxy	304